

Date: Tuesday, 4/18/2006 10:06:34 AM  
 User: Kim Johnston

## Process Sheet

Customer : CU-DAR001 Dart Helicopters Services Drawing Name : SUPPORT (412 AFT)  
 Job Number : 26683  
 Estimate Number : 11060  
 P.O. Number : NIA Part Number : D28961  
 This Issue : 4/18/2006 S.O. No. : NIA Drawing Number : D2896 REV A3 A4 06.04.18  
 Prsht Rev. : NC Project Number : N/A  
 First Issue : NIA Type : MACHINED PARTS Drawing Revision : A3 A4  
 Previous Run : NIA Material : NIA  
 Written By : SEE COMMENT BELOW Due Date : 5/4/2006 Qty: 8 Um: Each  
 Checked & Approved By : 06.04.18  
 Comment : Est: B 02.026 Reformat; Added P/O; Added mask hole KJ

## Additional Product

Job Number:



Seq. #: Machine Or Operation: Description :

1.0 PG PURCHASING



Comment: PURCHASING

Issue P/O: 1071

Description: D6104-011

Material: 17-4 PH SS (AMS 5643 OR AISI 630) as per Dwg D6104

Material release note required.

Blank size makes (2) D2896-1

C 206104/25

(8)

2.0 D6104011 17-4 SS Roundbar 6.50"OD



Comment: Qty.: 1.0000 Each(s)/Unit Total: 8.0000 Each(s)

Support

3.0 PACKAGING 1 PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Receive &amp; Inspect for Transit Damage

Ensure Material Release Note is attached

P O 6/5/3

118

4.0 MORI SEIKI MORI SEIKI CNC LATHE LARGE



Comment: MORI SEIKI CNC LATHE LARGE

Turn blank for Haas as per Folio FA167

M8/BG 06105/19

7

PTO

5.0 QC1 INSPECT ALL DIM TO DIM SHEET



Comment: INSPECT ALL DIM TO DIM SHEET

BG 06.05.25

7

[illegible]

H:\f\FORMS\Quality Assurance\approved QA\NCRWO RevD

Date: Tuesday, 4/18/2006 10:06:34 AM  
User: Kim Johnston

## Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: SUPPORT (412 AFT)

Job Number: 26683

Part Number: D28961

Job Number:



Seq. #:

Machine Or Operation:

Description:

6.0

BAND SAW

BAND SAW



Comment: BAND SAW

Machine as per Folio FA167

Tumble & Deburr

J.G. 1/6 06/06/15

(6)

PHD

65

7.0

QC1

INSPECT ALL DIM TO DIM SHEET



Comment: INSPECT ALL DIM TO DIM SHEET

J.G. 1/6 06/06/15

8.0

QC8

SECOND CHECK



Comment: SECOND CHECK

J.M. 06/06/16

9.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Mask Ø0.625" hole prior to paint

FL 06 06 16

(13)

10.0

POWDER COATING

POWDER COATING



Comment: POWDER COATING

Powder Coat White Gloss (Ref: 4.3.5.2) as per QSI 005 4.3

FL 06 06 16

(13)

11.0

QC3

INSPECT POWDER COAT/CHEMICAL CONVERSION



Comment: INSPECT POWDER COAT

DL 06/06/16

(13)

12.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Identify and Stock

Location:

ST 374

06/06/19

(13)

13.0

DC

DOCUMENT CONTROL



Comment: DOCUMENT CONTROL

Inspection Level 21

06/06/21

(13)

Job Completion



u 06/06/21

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector
06/05/19	1						

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
06/05/19	1	on first operation of turning tool moved, causing the $\phi$ of the part to be too small						

NOTE: Date & initial all entries

<b>DART AEROSPACE LTD</b>		<b>Work Order:</b>	26683
<b>Description:</b> Support		<b>Part Number:</b>	D2896-1
<b>Inspection Dwg:</b> D2896 Rev. A4		Page 1 of 1	

Inspect dimensions highlighted on inspection sheet drawing D2896 Rev A4/DSK080 Rev A and record below:

Dim	Min	Max	Go/No Go Gauge	Recorded Actual Dimensions				By	Date
				1	2	3	4		
<b>Lathe Section</b>									
A	3.480	3.485		3.484	3.482	3.483	3.482	MS	06/05/24
B	3.990	4.010		3.999	3.997	3.997	3.997		
C	3.825	3.845		3.833	3.835	3.835	3.836		
D	0.718	0.738		.726	.725	.726	.726		
E	0.090	0.110		.106	.104	.104	.104		
F	3.705	3.725		3.714	3.718	3.717	3.719		
G	1.360	1.380		1.366	1.367	1.368	1.368		
H	1.250	1.260		1.260	1.259	1.260	1.260		
I	6.490	6.510		6.492	6.493	6.496	6.495		
J	0.022	0.042		.032	.032	.032	.032		
K	0.240	0.260		.250	.250	.250	.250		
L	0.107	0.127		.116	.118	.117	.117		
M									
<b>HAAS Section</b>									
AA	2.152	2.172		Cannot measure					
AB	2.340	2.360		2.355	2.352	2.359	2.357		
AC	3.550	3.560		3.553	3.555	3.554	3.556		
AD	3.770	3.790		3.776	3.772	3.777	3.775		
AE	0.065 x 0.315	0.085 x 0.335		0.072 x .333	0.073 x 0.332	0.073 x .332	0.073 x .332		
AF	1.42	1.48		1.448	1.457	1.458	1.449		
AG	0.833	0.853		0.850	0.849	0.848	0.842		
AH	0.240	0.260		0.250	0.250	0.250	0.250		
AI	0.261	0.266	DT8707	0.261	0.265	0.264	0.265		
AJ	0.189	0.194	DT8706	0.186	0.184	0.188	0.188		
AK	1.990	2.010		2.000	1.997	1.995	1.993		
AL	0.625	0.630	DT8709	0.625	0.626	0.625	0.626		
AM	101.75	105.75	DT8697						
AN	0.053	0.073		0.054	0.063	0.062	0.063		
AO	0.927	0.947		0.947	0.947	0.943	0.945		
AP									
AQ									
<b>Accept/Reject</b>									

Measured by:	SP
Date:	06/06/14

Audited by:	BG (Lathe)
Date:	06.05.25

Rev	Date	Change	Revised by	Approved
A	02.12.13	New Issue	KJ/RF	
B	04.05.27	Dimension AE changed	KJ/RF	

<b>DART AEROSPACE LTD</b>			<b>Work Order:</b> 26683	
<b>Description:</b> Support			<b>Part Number:</b> D2896-1	
<b>Inspection Dwg:</b> D2896 Rev. A4			<b>Page 1 of 1</b>	

Inspect dimensions highlighted on inspection sheet drawing D2896 Rev A4/DSK080 Rev A and record below:

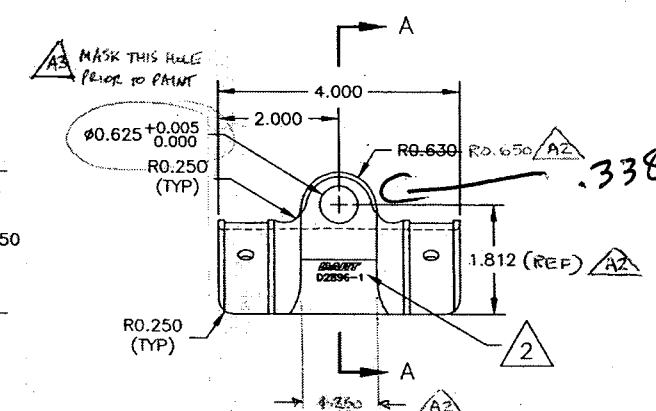
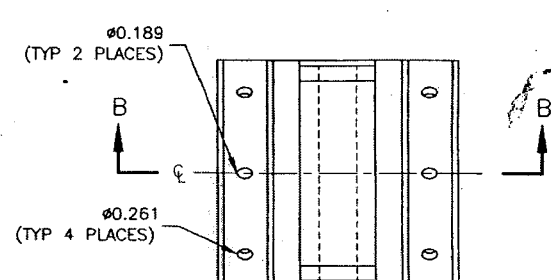
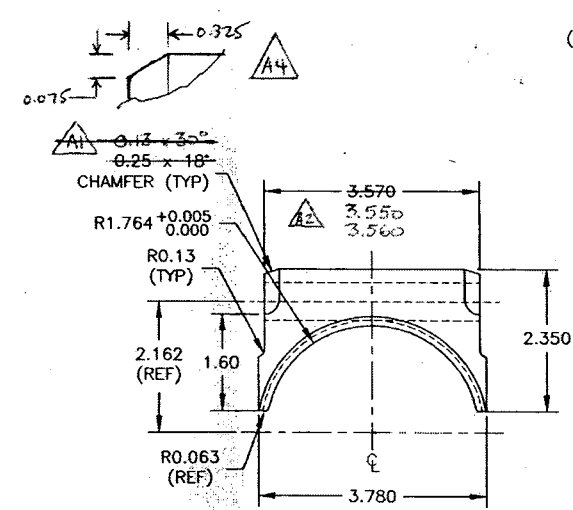
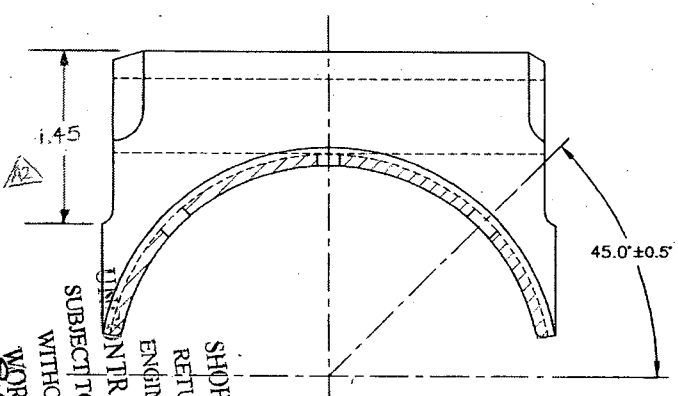
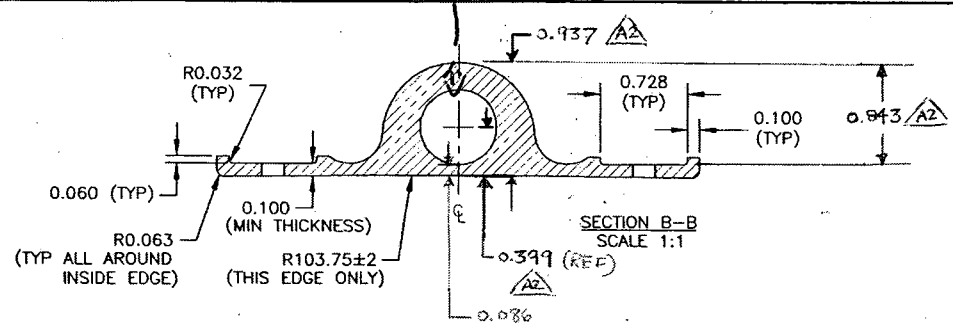
			Recorded Actual Dimensions					
Dim	Min	Max	5	6	7			By Date
<b>Lathe Section</b>								
A	3.480	3.485	3.483	3.485	3.484			M8 06/05/24
B	3.990	4.010	3.999	3.997	4.000			
C	3.825	3.845	3.839	3.834	3.835			
D	0.718	0.738	.726	.725	.730			
E	0.090	0.110	.104	.104	.100			
F	3.705	3.725	3.719	3.715	3.715			
G	1.360	1.380	1.369	1.368	1.370			
H	1.250	1.260	1.259	1.260	1.258			
I	6.490	6.510	6.497	6.496	6.497			
J	0.022	0.042	.032	.032	.032			
K	0.240	0.260	.250	.250	.250			
L	0.107	0.127	.119	.116	.117			
M								
<b>HAAS Section</b>								
AA	2.152	2.172	N/A	N/A	N/A			
AB	2.340	2.360	2.359	2.354	2.358			
AC	3.550	3.560	3.556	3.557	3.557			
AD	3.770	3.790	3.776	3.779	3.779			
AE	0.065 x 0.315	0.085 x 0.335	0.077 x .33	0.077 x .33	0.077 x .33			
AF	1.42	1.48	1.451	1.451	1.448			
AG	0.833	0.853	0.847	0.847	0.848			
AH	0.240	0.260	0.250	0.250	0.250			
AI	0.261	0.266	0.264	0.263	0.263			
AJ	0.189	0.194	0.188	0.189	0.189			
AK	1.990	2.010	1.995	1.991	1.996			
AL	0.625	0.630	0.625	0.626	0.626			
AM	101.75	105.75						
AN	0.053	0.073	0.063	0.063	0.063			
AO	0.927	0.947	0.946	0.944	0.944			
AP								
AQ								
<b>Accept/Reject</b>								

Measured by:	ET / J.G
Date:	06/06/25

Audited by:	BG 06.05.25 (Lathe)
Date:	

Rev	Date	Change	Revised by	Approved
A	02.12.13	New Issue	KJ/RF	
B	04.05.27	Dimension AE changed	KJ/RF	

RELEASED  
01-11-19



NO. 26683  
WORK ORDER  
SUBJECT TO AMENDMENT  
WITHOUT NOTICE  
CONTROLLED COPY  
ENGINEERING  
SHOP COPY  
RETURN TO  
DART AEROSPACE LTD.

- D2896-1
- 1) MATERIAL: 17-4 PH STAINLESS STEEL  
HEAT TREAT TO H900 CONDITION  
(900°F FOR 1 HR, AIR COOL)  
MIN UTS = 170 KSI (38 HRC)
  - 2) IDENTIFY WITH DART LOGO AND PART NUMBER IN THIS AREA  
WITH 0.125 HIGH LETTERING 0.010-0.020 DEEP
  - 3) BREAK ALL UNMARKED SHARP EDGES 0.010 TO 0.020
  - 4) PART IS SYMMETRIC ABOUT CENTERLINE
  - 5) FINISH: POWDER COAT WHITE (REF 4.3.5.2) PER DART QSI 005 4.3
  - 6) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED
  - 7) ALL DIMENSIONS ARE IN INCHES

D2896-1


A4	04.05.14	CORRECT CHAMFER	
A3	02.11.20	ADD MASKING NOTE	
A2	02.06.04	ADD DIMS, CHANGE RAD	
A1	01.11.13	CHANGED CHAMFER	
A	01.10.19	NEW ISSUE	

DESIGN	DRAWN BY	<b>DART</b>	DART AEROSPACE LTD.
CHECKER	APPROVED	DRAWING NO.	HARRISBURG, OHIO, CANADA
DATE		D2896	REV. A
		TITLE	SHEET 1 OF 1
		SUPPORT	SCALE
			1:2

9125  
2/625  
6  
25  
2  
50

50  
40  
10

1.679  
3125  
1.9915

CUSTOMER 96294	SHIP DATE 05/02/06 SHP	GROSS WEIGHT 333	QUOTE 30-161786-2	OF 2 <b>PACKING LIST</b>	
BILL TO: DART AEROSPACE		WORK ORDER **	ORDER DATE 04/25/06 ORD	TEST RESULTS	
SHIP TO: DART AEROSPACE 1270 ABERDEEN ST HAWKESBURY ON CANADA K6A 1K7		DELIVERY DATE 05/02/06 DEL	SHIP BRANCH 30(04)	SELL BRANCH 30-TOR	WORK ORDER UZ5248
CUSTOMER P.O. NUMBER PO00001071		TERRITORY 01	ENTRY ID 30BXT	6905 KENDERRY GATE, MISSISSAUGA ONTARIO, CANADA L5T 2Y <b>Copper and Brass Sales Canada</b> A ThyssenKrupp Materials NA company  ThyssenKrupp	
BUYER LINDA LACELLE		INSIDE SALES BRIAN TEDESCO		CUSTOMER SIGNATURE:	DATE:
BUYER TELEPHONE (613) 632-9577		INSIDE SALES TELEPHONE (905) 696-8100 37622		QUANTITY	ORDERED
SHIP VIA		SHIPPING STATUS		INVENTORY	309.24 LB
INTERNAL		COMPLETE X	PARTIAL	BILLING	8.00 PC
TO CUSTOMER COMMON/FRT-CCX		FOB DEST		WAREHOUSE	
BILL OF LADING		FREIGHT STATUS PPD		PACKED WITH OTHER GOODS	
				FINISHED GOODS LOCATION	WARN LABEL:1017
PART DESCRIPTION					408883-7
RD T-17-4 HFRT COND A SS BAR (ABOVE 6"), 6-1/2 (+.125 -0) -DART AEROSPACE, CUT 4.1" (+.125, -0) Test Results Attn to: QA Department.					
SPECIAL INSTRUCTIONS					
"Shipping, do not place any packages or goods on top of our material."					
FULL	SCRAP	FILLED BY SC	PACKED BY	QIA AUDIT	
CUSTOMER RECEIVING HOURS 8-3	MAX SKID WEIGHT 100	LOADING INSTRUCTIONS HAND, CRANE, FORK, DOCK		MAXIMUM BUNDLE WEIGHT 200	
BOXES 1	BARS	CASES	CUSHP	PKGS	SKIDS
BDLS	TUBES	CTNS	FLAT	COILS	
INSPECTION RECORD					

# TEST RESULTS

## CERTIFICATE OF COMPLIANCE

We hereby certify that mercury or any of its compounds are not used in the processing and distribution of our products. The products we distribute are not hazardous in their received state. For MSDS sheets go to [www.copperandbrass.com/msds](http://www.copperandbrass.com/msds) or call 248-233-5682. We hereby certify that the material above complies with the following specifications:

ASTM-A564	AMS 5643Q	AISI 630	ROHS COMPLIANT
TAG NO	QUANTITY UOM VENDOR VEND PO HEAT/LOT	PCS : TAG NO	QUANTITY UOM VENDOR VEND PO HEAT/LOT
	4.00 PC VALBRUN 0CJ5160 241255	4 :	4.00 PC VALBRUN 0CG0873 416445

MARY L. TAYLOR

- General Manager: TORONTO

PRINTED 04/27/06 11:14 AM

CONTROL NO 00048

COPPER AND BRASS SALES CANADA IS A DIVISION OF THYSSENKRUPP MATERIALS, CA. LTD./LIEB



**VALBRUNA**

SLATER STAINLESS, INC.  
2400 Taylor Street West, P.O. Box 630  
Fort Wayne, Indiana USA 46801  
Phone: 260-434-2892 Fax: 260-434-2905

**Product Certification Report****Report Number: 4156790****Certified on Mar 21, 2006 Page 1 of 1**

Order I D <b>0600634 001</b>		Order Date <b>3/02/06</b>		Commodity Code <b>408883-7</b>	
Dim 1 <b>6.5000</b>	Dim 2 <b>.0000</b>	Dim 3 <b>.0000</b>	Heat I D <b>241255</b>	Customer I D. <b>001155</b>	Customer Purchase Order <b>CJ5160</b>
Product Shape <b>Rounds</b>			Product Surface <b>HR &amp; Rough Turned</b>		Customer Grade <b>17-4</b>
Length (Inches) <b>120.000 Min. 168.000 Max.</b>			Bill of Lading # <b>402800</b>	Weight	

**Ship To**

**COPPER AND BRASS SALES  
415 STATE PARKWAY  
SCHAUMBURG, IL 60173**

**Sold To**

**VALBRUNA STAINLESS, INC.  
2400 TAYLOR STREET WEST  
FORT WAYNE, IN 46802**

**Lifts: 0073 0074 0075****AISI 630****CONDITION A****MAXX stainless****ASTMA 564-04****ASMESA 564 01 ED 2002 ADD****AMS 2303E****AMS 5643Q****CHEMICAL ANALYSIS**

C	Mn	P	S	Si	Cr	Ni	Mo	Cu	N	Cb	Ta	Cb+Ta
0.37	.58	.024	.025	.46	15.67	4.66	.23	3.40	.04	.28	.001	.28

**HB****347****TENSILE PROPERTIES****CAPABILITY**

HB	TS (PSI)	2%YS (PSI)	%EL(2")	%RA	AGE(F)
428	199200	182100	13.6	47.8	900

**MAGNETIC PARTICLE TEST****FREQ SEV****AVG .00 .00****MACRO ASTM E340/E381****MACRO****OK****OK****OK****PERCENT FERRITE****% FERRITE****AVG .5****Free of mercury and low melting alloy contamination.****MAXX stainless.****Chemical testing performed to one or several of the following ASTM methods: E415, E572, E1019, E1085, E1086.****Material melted in Italy, manufactured in the United States.****Material conforms to listed specifications.****Quality system is compliant with ISO 9001:2000. Produced in accordance with EN 10204 3.1B.****COPPER AND BRASS SALES****SOLD TO:****DATE:****QTY:****CUSTOMER PO:****SHIPPER NO:****BY:**

Results relate only to the items tested. Certification shall not be reproduced except in full, without written approval of Valbruna Stainless Inc. The recording of false, fictitious, or fraudulent statements on this document may be punished as a felony under federal statutes, including Federal law, Title 18, Chapter 47. Consult material safety data sheet (MSDS) for hazard info. I hereby certify that the reported figures are correct as contained in the records of the corporation.

**Manager Laboratory Services****Dennis Hackett**



**VALBRUNA**  
**SLATER STAINLESS, INC.**  
2400 Taylor Street West, P.O. Box 630  
Fort Wayne, Indiana, USA 46801  
Phone: 260-434-2892 Fax: 260-434-2905

## Product Certification Report

Report Number: **4111010**

Certified on Oct 07, 2005 Page 1 of 1

Order I.D. <b>0501321 001</b>		Order Date <b>6/29/05</b>		Commodity Code <b>408883-7</b>	
Dim 1 <b>6.5000</b>	Dim 2 <b>.0000</b>	Dim 3 <b>.0000</b>	Heat I.D. <b>416445</b>	Customer I.D. <b>001155</b>	Customer Purchase Order <b>CE4037 CG0873</b>
Product Shape <b>Rounds</b>			Product Surface <b>HR &amp; Rough Turned</b>		Customer Grade <b>630</b>
Length (Inches) <b>120.000 Min. 168.000 Max.</b>			Bill of Lading # <b>401955</b>	Weight	

**Ship To**

**COPPER AND BRASS SALES**  
**415 STATE PARKWAY**  
**SCHAUMBURG, IL 60173**

**Sold To**

**VALBRUNA CORP.**  
**31 IRON HORSE ROAD**  
**OAKLAND, NJ 07436**

**Lifts: 0091 0092 0093 0094 0095**

**AISI 630**

**CONDITION A**

**MAXX stainless**

**ASTMA 564-04**

**ASMESA 564 01 ED 2002 ADD**

**AMS 2303E**

**AMS 5643Q**

### CHEMICAL ANALYSIS

C	Mn	P	S	Si	Cr	Ni	Mo	Cu	N	Cb	Ta	Cb+Ta
.045	.61	.025	.023	.46	15.50	4.64	.21	3.40	.04	.32	.001	.32

**HB**

**352**

### ENSILE PROPERTIES

#### CAPABILITY

HB	TS (PSI)	.2%YS (PSI)	%EL(2")	%RA	AGE(F)
407	196900	171000	17.4	49.0	900

### MAGNETIC PARTICLE TEST

**FREQ SEV**

**AVG .03 .15**

### MACRO ASTM E340/E381

**MACRO**

**OK**

**OK**

**OK**

### PERCENT FERRITE

**% FERRITE**

**AVG .5**

**Free of mercury and low melting alloy contamination.**

**MAXX stainless.**

**Chemical testing performed to one or several of the following ASTM methods: E415, E572, E1019, E1085, E1086**

**Material melted in Italy, manufactured in the United States.**

**Material conforms to listed specifications.**

**Quality system is compliant with ISO 9001:2000. Produced in accordance with EN 10204 3.1B.**

### COPPER AND BRASS SALES

**SOLD TO:**

**DATE:**

**CUSTOMER PO:**

**SHIPPER NO:**

**BY:**

Results relate only to the items tested. Certification shall not be reproduced except in full, without written approval of Valbruna Stainless Inc. The recording of false, fictitious, or fraudulent statements on this document may be punished as a felony under federal statutes, including Federal law, Title 18, Chapter 47. Consult material safety data sheet (MSDS) for hazard info. I hereby certify that the reported figures are correct as contained in the records of the corporation.

Manager Laboratory Services

*Dennis Hackett*  
Dennis Hackett

# COPPER AND BRASS SALES

## MATERIAL TYPE STAINLESS STEEL

AISI SERIES  
200 300 400  
AND  
PRECIPIT HARDENING GRADES

### "WARNING"

INHALATION OF FUMES, FRESHLY GENERATED BY THE WELDING OF STAINLESS STEEL CONTAINING ONE OR MORE OF THE FOLLOWING INGREDIENTS, ZINC, MAGNESIUM OR COPPER, ARE KNOWN TO CAUSE METAL FUME FEVER. INHALATION OF DUST OR FUME FROM STAINLESS STEEL CONTAINING ONE OR MORE OF THE FOLLOWING INGREDIENTS, ALUMINUM, IRON, MANGANESE, SELENIUM, OR TIN, HAS ALSO BEEN REPORTED TO CAUSE METAL FUME FEVER AND MAY CAUSE IRRITATION TO THE RESPIRATORY TRACT AND/OR AGGRAVATE PRE-EXISTING CONDITIONS. TARGET ORGAN IS PRIMARILY THE LUNG.

THIS PRODUCT CONTAINS CHROMIUM. EXPOSURE TO CHROMIUM DUST OR FUME MAY CAUSE METAL FUME FEVER WITH FLU-LIKE SYMPTOMS AND KIDNEY AND LIVER DAMAGE. UNDER HIGH TEMPERATURES, HEXAVALENT CHROMIUM MAY BE PRODUCED. IF IN THE INSOLUBLE FORM, IT IS A CONFIRMED HUMAN CARCINOGEN. THIS PRODUCT MAY ALSO CONTAIN NICKEL AND COBALT. INHALATION OF NICKEL OR COBALT DUST OR FUME MAY RESULT IN INFLAMMATION OF THE RESPIRATORY TRACT. NICKEL AND COBALT HAVE BEEN IDENTIFIED AS POTENTIAL HUMAN CARCINOGENS.

IF COATED WITH OIL, MAY CAUSE SKIN IRRITATION/DERMATITIS BY CONTACT. WELDING FUME IS LISTED AS A POSSIBLE CARCINOGENIC TO HUMANS.

READ THE STAINLESS STEEL MATERIAL SAFETY DATA SHEET (MSDS) ON FILE WITH YOUR EMPLOYER BEFORE WORKING WITH THIS MATERIAL

- \* If processing or recycling produces particulate, use exhaust ventilation or other controls designed to prevent exposure to workers. Examples of such activities include melting, welding, grinding, abrasive sawing, sanding and polishing. Any activity which abrades the surface of this material can generate airborne particulate. Use respiratory protection (P100, quantitative fit testing required) if exposures exceed the permissible limits.
- \* The Occupational Safety and Health Administration (OSHA) have set mandatory limits on occupational exposures.
- \* Stainless Steel, in solid form and as contained in finished products presents no special health risk.
- \* Sold for manufacturing purposes only. This product can be recycled; contact your sales representative.

The Occupational Safety and Health Administration require employers to provide training in the proper use of this product.

For additional information, call or write to Copper and Brass Sales, 22355 West Eleven Mile Road, Southfield, MI 48034, telephone 248-233-5600, or visit our web site @ [www.copperandbrass.com](http://www.copperandbrass.com).

